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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,152	06/30/2003	Hakansson Bo	1275	8148

7590 06/06/2007
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EXAMINER

WILKINS III, HARRY D

ART UNIT	PAPER NUMBER
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1742

MAIL DATE	DELIVERY MODE
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06/06/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/608,152	Applicant(s) BO ET AL.	
	Examiner Harry D. Wilkins, III	Art Unit 1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 23 is/are rejected.
- 7) ☒ Claim(s) 1 and 23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

is noted

HW

1. The claim listing provided with the response filed 13 April 2007, however, the status identifier associated with claim 23 is incorrect. Claim 23 is not a new claim as it was presented in Applicant's reply filed 10 October 2006. The proper status identifier for claim 23 should be "Previously Presented". However, in order to avoid undue delays in prosecution, the response is being accepted as filed with the noted error.

Claim Objections

2. Claim 1 is objected to because of the following informalities: in line 4, this claim recites "comparing", which should be "comprising".
3. Claim 23 is objected to because of the following informalities: in lines 6-8, "wherein the electrolyte solution has a pH from about 5.5 to about 8" is repeated.
4. Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-12 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wanngard (US 5,419,818) in view of Oda et al (US 4,299,682).

Wanngard teaches (see col. 1, lines 18-37, cols. 3-6) a process for producing alkali metal chlorate in a divided electrolytic cell (12) including electrolyzing the anolyte

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electrolyte solution and transferring the electrolyzed solution to a chlorate reactor (4).

The cell of Wanngard was preferably divided by a cationic selective membrane.

Wanngard teach that the electrolytic cell (12) is a divided electrolytic cell. In this process, the anolyte fed to the cell included NaCl and the catholyte included NaOH.

The anolyte was electrolyzed to generate Cl_2 gas at the anode and the catholyte was electrolyzed to generate NaOH at the cathode. The Cl_2 was immediately hydrolyzed into HClO and HCl (Wanngard at col. 3, lines 59-68). The HClO is then reacted in the chlorate reactor to form sodium chlorate (NaClO_3).

Thus, Wanngard fails to teach the claimed cell which was had a gas diffusion cathode.

Oda et al teach (see abstract, figure 2, col. 1 and col. 4, line 30-col. 6, line 5) that in divided electrolytic cells for the electrolytic production of Cl_2 and NaOH, the operating voltage of the cell can be reduced by using a gas diffusion cathode, and feeding oxygen to the cathode through a gas chamber 9.

Therefore, it would have been obvious to one of ordinary skill in the art to have used the gas diffusion cathode as taught by Oda et al in the divided electrolysis cell taught by Wanngard because of decreased operating voltage which lead to an increased current efficiency.

It is noted that the overall reaction provided by the process cell of Oda et al is identical to the reaction provided by the process of Wanngard. Both cells react an incoming NaCl anolyte and NaOH catholyte to produce Cl_2 gas at the anode and additional NaOH at the cathode. The Cl_2 of Wanngard immediately dissolves into the

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solvent (water) to form HClO and HCl. Therefore, one of ordinary skill in the art would have had a reasonable expectation of successfully substituting the gas diffusion electrode of Oda et al into the cell of Wanngard.

Regarding claim 2, Oda et al teach (as above, figure 2) that the gas diffusion electrode divided the cathode compartment into a gas chamber (9) on one side of the gas diffusion electrode and an alkali metal hydroxide chamber (7) on the other side thereof. An alkali metal solution was introduced to the alkali metal hydroxide chamber at 12 and an oxygen containing gas was introduced to the gas chamber at 14.

Regarding claim 3, Oda et al teach (as above) using a cation selective membrane.

Regarding claims 4-6 and 11, Wanngard teaches (see col. 6) using a pH of the solution of 5.5-6.5, a chloride concentration of 100-140 g/l, a chlorate concentration of 500-650 g/l and a temperature of 50-100°C.

Regarding claim 7, Wanngard does not teach the claimed concentration of chlorate. However, it would have been obvious to one of ordinary skill in the art to have optimized the concentration of the chlorate being fed to the electrolyzer in order to maximize current efficiency and achieve optimum production rate for chlorate.

Regarding claim 8, Wanngard teaches (see col. 7, lines 5-8) using a minor addition of sodium chromate. It would have been obvious to one of ordinary skill in the art to have optimized the amount of chromate used.

Regarding claim 9, Oda et al teach performing the electrolysis reaction without the addition of any chromate.

Regarding claim 10, Wanngard does not disclose a concentration of sodium hydroxide in the catholyte. However, it would have been obvious to one of ordinary skill in the art to have optimized the concentration of the hydroxide being produced in the electrolyzer in order to achieve proper reaction rate.

Regarding claim 12, Wanngard teaches feeding both the electrolyzed anolyte and the electrolyzed catholyte to the chlorate reactor (4).

Regarding claim 23, the cell of Oda et al included (see figure 2) a gas diffusion electrode (8) which divided the cathode compartment into a gas chamber (9) on one side of the gas diffusion electrode and an alkali metal hydroxide chamber (7) on the other side between the gas diffusion electrode and the cation selective separator. The process of Oda et al included (see Example 1) introducing a weak alkali metal hydroxide solution into the alkali metal hydroxide chamber and oxygen containing gas into the gas chamber. The cation selective separator was a membrane. Wanngard teaches (see cols. 3-4) using a pH of the solution of 5.0-7.5.

Response to Arguments

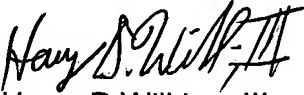
7. Applicant's arguments, filed 13 April 2007, with respect to the rejection of claims 1-12 and 23 under 35 USC 103 utilizing Juda (US 3,124,520) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Oda et al (US 4,299,682).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D. Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Harry D Wilkins, III
Primary Examiner
Art Unit 1742

hdw